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## DEFENSE MANAGEMENT

# Increased Attention on Fuel Demand Management at DOD's Forward-Deployed Locations Could Reduce Operational Risks and Costs

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Defense Capabilities and Management



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Mr. Chairman and Members of the Subcommittee:

I am pleased to be here today to discuss the Department of Defense's (DOD) efforts to reduce fuel demand at its forward-deployed locations, particularly those that are not connected to local power grids. In 2008, more than 68 million gallons of fuel, on average, were supplied by DOD each month to support U.S. military forces in Iraq and Afghanistan. Transporting large quantities of fuel to forward-deployed locations presents an enormous logistics burden and risk. Long truck convoys moving fuel to forward-deployed locations have encountered enemy attacks, severe weather, traffic accidents, and pilferage. For example, DOD reported that in June 2008 alone, 44 trucks and 220,000 gallons of fuel were lost due to attacks or other events while delivering fuel to Bagram Air Field in Afghanistan. High fuel demand, coupled with the recent volatility of fuel prices, also have significant implications for DOD's operating costs. The fully burdened cost of fuel—that is, the total ownership cost of buying, moving, and protecting fuel in systems during combat—has been reported to be many times higher than the price of a gallon of fuel itself. While DOD's weapon systems require large amounts of fuel, the department reports that the single largest battlefield fuel consumer is generators, which provide power for base support activities such as air conditioning/heating, lighting, refrigeration, and communications. A 2008 Defense Science Board Task Force report noted that Army generators consume about 26 million gallons of fuel annually during peacetime but 357 million gallons annually during wartime.<sup>1</sup>

Today, we are publicly releasing a report that addresses DOD's (1) efforts to reduce fuel demand at forward-deployed locations and (2) approach to managing fuel demand at these locations.<sup>2</sup> My statement will highlight the key findings and recommendations of our report. Our review focused on locations that were in Central Command's area of responsibility. As part of this work, we analyzed DOD documents, interviewed agency officials, and visited two forward-deployed locations—Camp Arifjan, Kuwait, and Camp Lemonier, Djibouti—to gain a firsthand understanding of fuel demand

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<sup>1</sup>Defense Science Board Task Force on DOD Energy Strategy, *More Fight—Less Fuel* (February 2008).

<sup>2</sup>GAO, *Defense Management: DOD Needs to Increase Attention on Fuel Demand Management at Forward-Deployed Locations*, GAO-09-300 (Washington, D.C.: Feb. 20, 2009).

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reduction efforts and challenges facing these locations.<sup>3</sup> We conducted our review from March 2008 through February 2009 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

This is the third in a series of studies that you have requested examining DOD's energy use for military operations. In March 2008, we issued a report and I testified before this Subcommittee on the need for DOD to establish an overarching organizational framework to guide and oversee energy reduction efforts for military operations.<sup>4</sup> In addition, we are currently conducting work at your request on renewable energy at U.S. military installations.

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## DOD Has Initiated Efforts to Reduce Fuel Demand at Forward-Deployed Locations but Lacks an Effective Approach to Managing Demand

DOD has efforts under way or planned to reduce fuel demand, but the department lacks an effective approach to enable widespread implementation and sustained attention to fuel demand issues at forward-deployed locations. Many of DOD's efforts to reduce fuel demand at forward-deployed locations are in a research and development phase, and the extent to which they will be fielded and under what time frame is uncertain. Notable efforts by DOD components include the application of foam insulation to tent structures, the development of more fuel-efficient generators and environmental control units, and research on alternative and renewable energy sources for potential use at forward-deployed locations. In addition, during our visits to Kuwait and Djibouti, we found local camp efforts aimed at reducing fuel demand. The following

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<sup>3</sup>At the time of our visit in June 2008, both camps were under Central Command's area of responsibility. On October 1, 2008, DOD transferred Camp Lemonier under its newly established Africa Command.

<sup>4</sup>GAO, *Defense Management: Overarching Organizational Framework Needed to Guide and Oversee Energy Reduction Efforts for Military Operations*, GAO-08-426 (Washington, D.C.: Mar. 13, 2008) and *Defense Management: Overarching Organizational Framework Could Improve DOD's Management of Energy Reduction Efforts for Military Operations*, GAO-08-523T (Washington, D.C.: Mar. 13, 2008).

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summarizes some of DOD's initiatives. Additional initiatives are highlighted in the report that we publicly released today.<sup>5</sup>

- **Foam insulation for military tents.** DOD is applying foam insulation on tents at some forward-deployed locations to reduce the amount of fuel required by generators to provide power to these structures. Demonstrations by DOD's Power Surety Task Force showed that the application of foam insulation reduced dust, heat, cold, noise, and air conditioning requirements. According to task force officials, based on the results of a recent demonstration, DOD decided to pursue a large-scale effort to apply the foam insulation to temporary structures, such as military tents, in Iraq to reduce the number of generators needed to power the structures. According to a Central Command official, the tent-foaming initiative could reduce energy consumption by approximately 50 percent, potentially reducing the number of convoys needed to supply fuel to locations in Iraq, although metrics had not yet been established to systematically measure efficiency. A senior Army official told us that DOD also has plans to apply foam insulation to tents in Afghanistan.
- **Fuel-efficient generators and environmental control units.** The Project Manager-Mobile Electric Power office, a DOD joint program organization, is developing a next generation of generators, called the Advanced Medium Mobile Power Sources, which employ advanced technologies to achieve greater fuel efficiency and other improvements over current military generators. The office plans to begin procurement of these generators in 2010. In addition, it intends to replace its current environmental control units with improved environmental control units to provide cooling, heating, and dehumidifying for servicemembers and material systems. The improved units, one version of which is currently in low-rate production, are expected to reduce energy consumption by up to 25 percent over current units.
- **Renewable and alternative energy technology initiatives.** Several military services are exploring the use of alternative and renewable energy technologies to generate power at forward-deployed locations and reduce petroleum-based fuel demand. For example, the Air Force Research Laboratory has created the Renewable Energy Tent City—a collection of various deployable shelters powered by solar and fuel cell generators. The Marine Corps Systems Command is developing the Deployable Renewable Energy Alternative Module—a module towed by vehicle that would

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<sup>5</sup>GAO-09-300, pp. 12-19.

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employ solar, wind turbine, battery, and generator technologies to temporarily power radios or computers until fuel can be resupplied to forward-deployed locations. In addition, the Army Research Laboratory is working with universities and private sector firms to develop a processor that converts tires into energy and recyclable products for potential use at forward-deployed locations.

- **Initiatives at individual locations.** During our visits to forward-deployed locations in Kuwait and Djibouti, we found some local efforts by camp officials to reduce fuel demand. In Kuwait, for example, an official at Camp Arifjan shared plans to consolidate loads on small generators by creating groupings—networks—of multiple generators, which could improve overall efficiency and reduce the number of generators that operate at most times of the year. In Djibouti, officials at Camp Lemonier were able to remove two of the five air conditioning units used to cool the camp’s gymnasium after the application of foam insulation to the tent exterior of the facility, resulting in an estimated fuel savings of 40 percent and an indoor temperature reduction from 95-100 degrees to about 72 degrees Fahrenheit.

While these efforts show potential for achieving greater fuel efficiency, DOD lacks an effective approach to fuel demand management at forward-deployed locations. DOD has stated that it needs to reduce its dependence on petroleum-based fuel and the logistics footprint of its military forces, as well as reduce operating costs associated with high fuel usage. However, DOD faces difficulty in achieving these goals because managing fuel demand at forward-deployed locations has not been a departmental priority and its fuel reduction efforts have not been well coordinated or comprehensive. More specifically, we found that DOD lacked (1) guidance directing forward-deployed locations to address fuel demand, (2) incentives and a viable funding mechanism for locations to invest in fuel reduction initiatives, and (3) visibility and accountability within the chain of command for achieving fuel reduction. The following summarizes these key findings. Additional information is provided in our report.<sup>6</sup>

1. **Lack of guidance.** DOD generally lacks guidance that directs forward-deployed locations to manage and reduce their fuel demand—at the department level, combatant command level, and military service level. While DOD is driven to address energy issues at its U.S. installations largely by federal mandates and DOD guidance, agency officials were

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<sup>6</sup>GAO-09-300, pp. 19-34.

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unable to identify similar guidance for forward-deployed locations, and they told us that fuel reduction has been a low priority compared with other mission requirements. Our analysis of combatant command and military service guidance related to forward-deployed location construction showed that the existing guidance is largely silent with respect to fuel demand management and energy efficiency. Similarly, we found a lack of attention to fuel demand as forward-deployed locations are sustained and products are procured for the locations. The Joint Staff has begun an effort to develop common living standards, referred to as “joint standards of life support” (e.g., square footage for living space per person, duration of showers), for military servicemembers at forward-deployed locations, which present an opportunity to make decisions that take into account fuel demand considerations. However, Joint Staff officials told us that fuel reduction has not been considered in this effort to date.

2. **Lack of incentives and viable funding mechanism.** DOD has not established incentives or a viable funding mechanism for fuel reduction projects at its forward-deployed locations, which discourages commanders from identifying fuel demand management as a priority. Officials at Camp Lemonier, for example, had identified several projects that would reduce the camp’s fuel demand but told us they saw little “return on investment” for them to undertake such projects because they would not see the associated savings for use toward other camp improvements. Moreover, many of DOD’s forward-deployed locations rely heavily on funding from supplemental appropriations related to the Global War on Terrorism, and delays in receiving this funding can present challenges in covering existing costs, making it difficult for commanders to fund more expensive fuel reduction projects. Funding mechanisms exist to promote energy reduction projects at permanent DOD installations, including an energy conservation program and energy-performance saving contracts with private sector firms. In addition, DOD encourages energy reduction efforts at U.S. installations through energy awareness programs and energy-efficiency awards; and the Navy has established an energy conservation program through which ships that use less than the Navy’s established baseline amount of fuel receive the associated quarterly fuel savings toward the purchase of shipboard items. Without incentives and a viable funding mechanism, commanding officials at DOD’s forward-deployed locations are unlikely to identify fuel reduction as a priority for making a significant investment of resources.

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## GAO Recommends That DOD Take Actions to Improve Fuel Demand Management at Forward-Deployed Locations

3. **Lack of visibility and accountability.** DOD's current organizational framework does not provide the department visibility for fuel demand issues at its forward-deployed locations. We found that information on fuel demand management strategies and reduction efforts is not shared among locations, military services, and across the department in a consistent manner. Moreover, DOD guidance does not designate any DOD office or official as being responsible for fuel demand management at forward-deployed locations, and we could not identify anyone who is specifically accountable for this function through our interviews with various DOD and military service offices. The Duncan Hunter National Defense Authorization Act for Fiscal Year 2009 requires DOD to establish a Director of Operational Energy Plans and Programs, an operational energy strategy for DOD, and military department-level operational energy officials.<sup>7</sup> DOD has not yet established a director or strategy for operational energy. In meeting the requirements, DOD has an opportunity to improve visibility and accountability for fuel demand management at forward-deployed locations.

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We recognize that it may not be practical for DOD to decrease fuel usage at every forward-deployed location and that base commanders must place their highest priority on meeting mission requirements. However, DOD's high costs, operational vulnerabilities, and logistical burdens in sustaining forward-deployed locations that depend heavily on fuel-based generators underscore the importance for the department to give systematic consideration to incorporating fuel demand into construction, maintenance, procurement, and other policy decisions for forward-deployed locations. In the report that we publicly released today, we make several recommendations that would facilitate the widespread implementation of DOD's fuel reduction initiatives and sustained attention to fuel demand issues at its forward-deployed locations. In summary, we recommend that:

- the combatant commanders and the military services establish requirements and guidelines on fuel demand management at forward-deployed locations;

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<sup>7</sup>The act defines operational energy as the energy required for training, moving, and sustaining military forces and weapons platforms for military operations; it includes energy used by tactical power systems, generators, and weapons platforms.

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- the Joint Staff incorporate fuel demand considerations into its initiative to develop joint standards of life support at DOD's forward-deployed locations;
- DOD designate the new, congressionally-mandated director of operational energy as the department's lead proponent of fuel demand management at forward-deployed locations and that the director, in establishing a departmentwide operational energy strategy, address the shortcomings related to managing fuel demand at forward-deployed locations that I have highlighted in this statement; and
- the military departments' senior energy officials be assigned, among their other duties, responsibility for overseeing fuel demand management at forward-deployed locations within their respective services.

DOD generally concurred with all of our recommendations. However, in its response to our draft report, the department did not provide specific actions or time frames within which it would address the issues we raised.

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Mr. Chairman and Members of the Subcommittee, this concludes my prepared statement. I would be happy to answer any questions that you may have at this time.

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## Contacts and Acknowledgments

For further information regarding this testimony, please contact William Solis at (202) 512-8365 or [solisw@gao.gov](mailto:solisw@gao.gov). In addition, contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement. Individuals who made key contributions to this testimony are Assistant Director Thomas Gosling and Alissa Czyz.

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